



6.1 Improvement Options

MP 5± to MP 6±

Horizontal

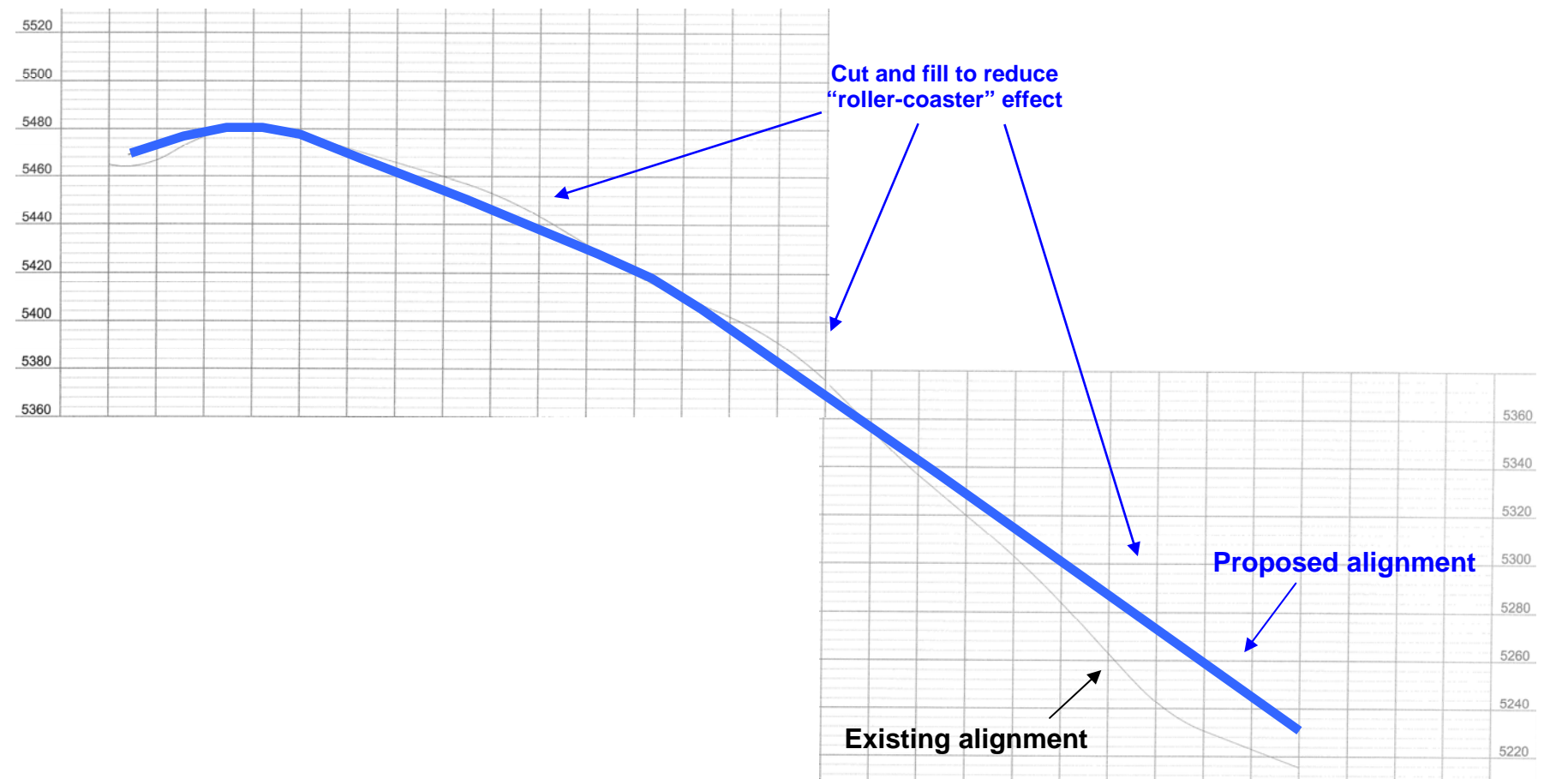
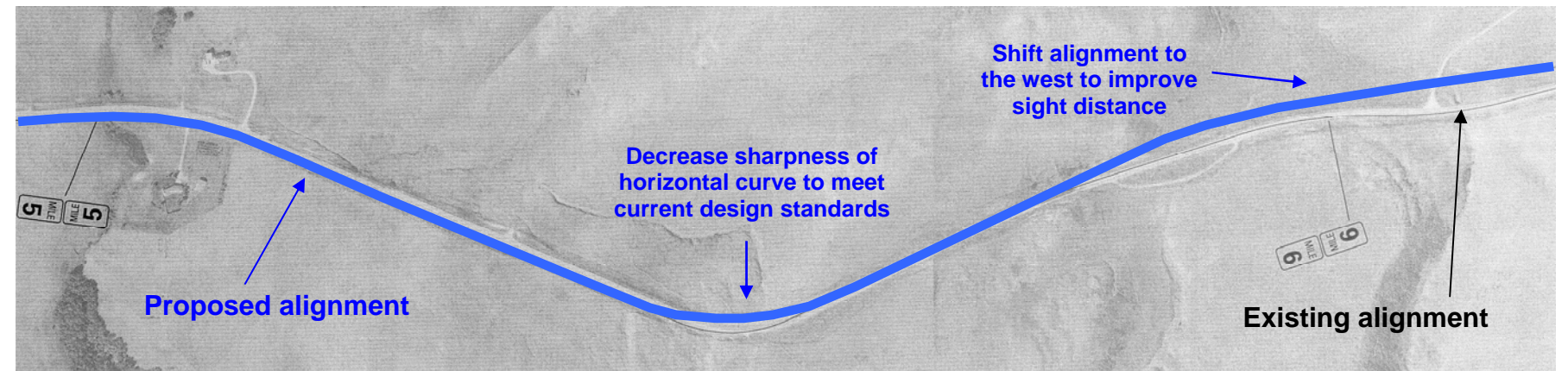
At MP 5.5±, there is a sharp horizontal curve. As noted in Figure 4.2, this curve is rated “poor” due to its inadequate curve radius.

As shown in Figure 6.1, it is proposed that the roadway be shifted to the west in this location to decrease the sharpness of this curve. The alignment was shifted only far enough to ensure that the curve meets current design standards.

Beginning at MP 5.8±, it is proposed that the roadway be shifted to the west again in order to improve sight distance.

Vertical

Between MP 5± and 6±, there are several sag and crest curves in the vertical alignment, creating a “roller-coaster” effect. Grades exceeding the maximum recommended grade within this portion of MT 78 range from approximately eight to 11 percent. As noted in Figure 4.2, these curves are rated “fair” and “poor,” due to their steep grades. It is proposed that cut and fill be used to reduce this effect and create a more uniform grade. This action would bring the curve up to current design standards.

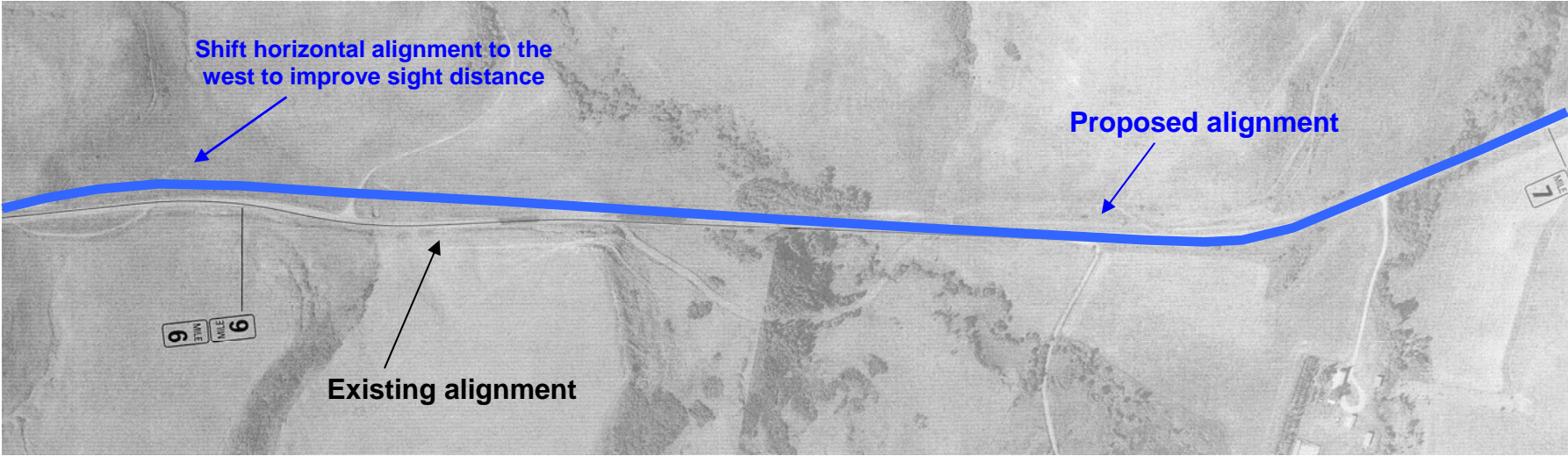




MP 6± to MP 7±

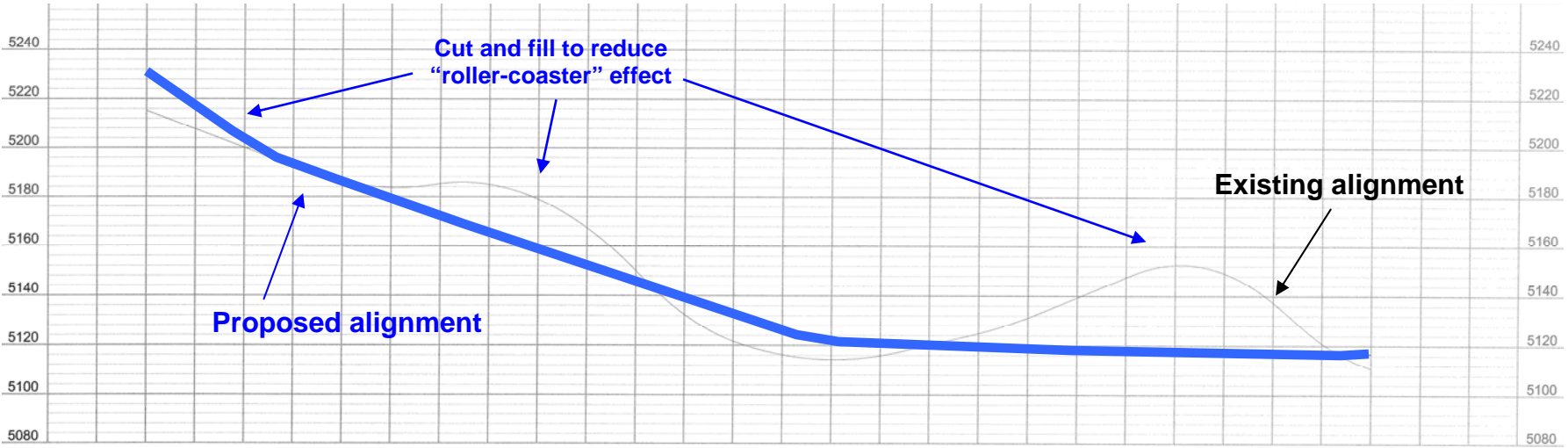
Horizontal

Near MP 6±, it is proposed that the roadway be shifted to the west in order to improve sight distance.



Vertical

Between MP 6± and 7±, there are several sag and crest curves in the vertical alignment, creating a “roller-coaster” effect. Grades exceeding the maximum recommended grade within this portion of MT 78 range from approximately nine to ten percent. It is proposed that cut and fill be used to reduce this effect and create a more uniform grade.

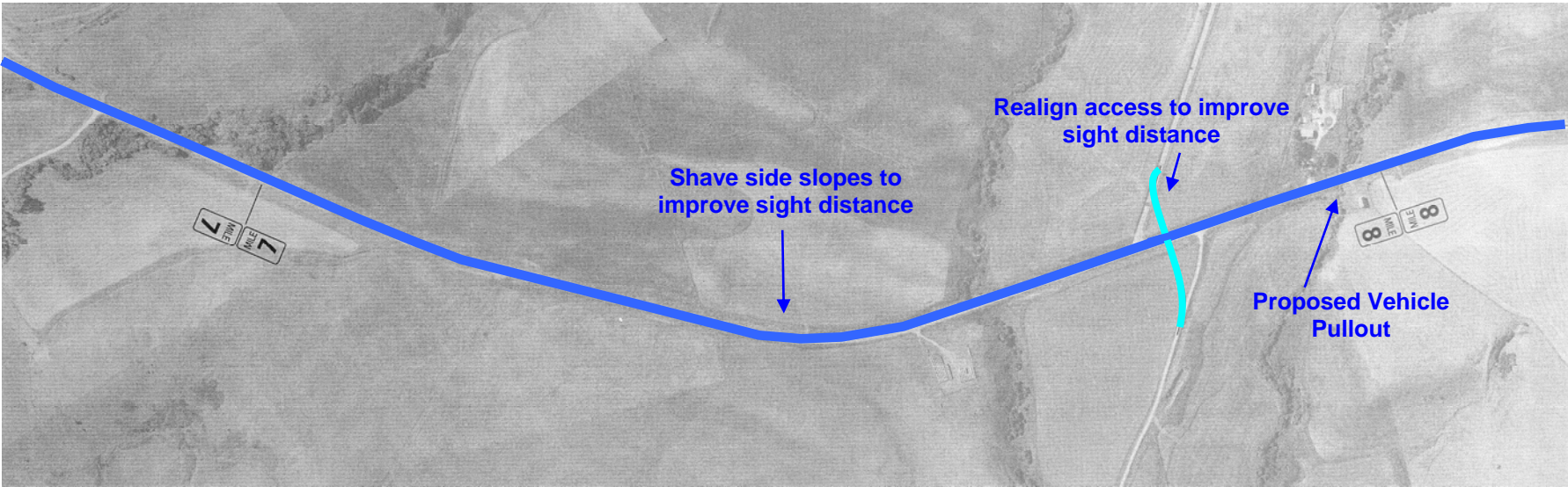




MP 7± to MP 8±

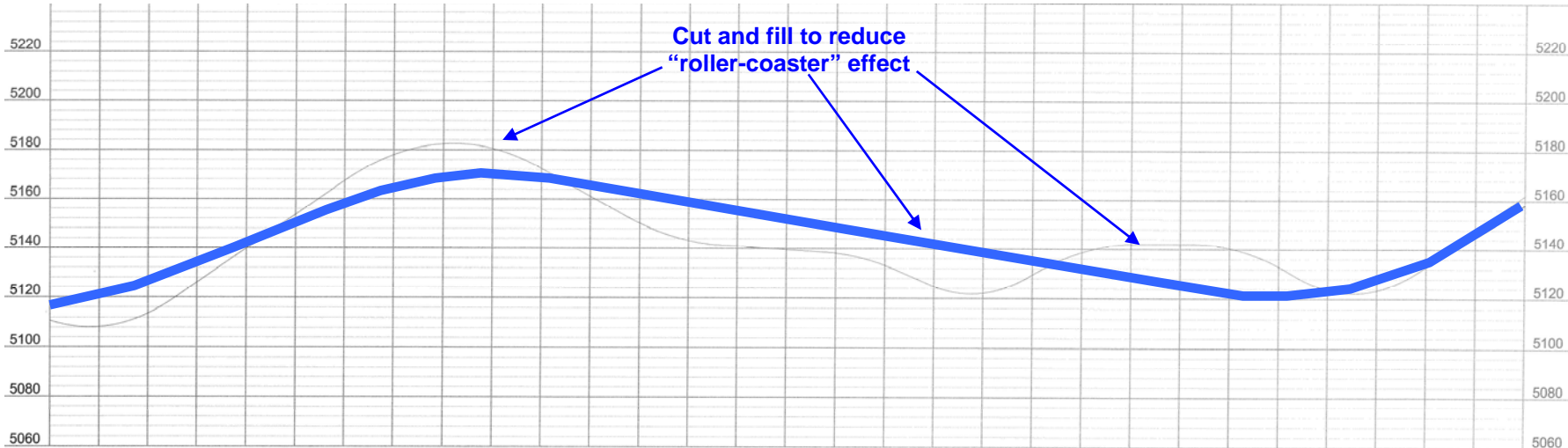
Horizontal

Between MP 7± and MP 8±, it is proposed that the side slopes be shaved to improve sight distance. At MP 7.8±, it is proposed that the access points be realigned to improve sight distance. At MP 7.9±, a vehicle pullout is proposed.



Vertical

Between MP 7± and MP 8±, there are several sag and crest curves in the vertical alignment, creating a “roller-coaster” effect. Grades exceeding the maximum recommended grade within this portion of MT 78 range from approximately seven to nine percent. It is proposed that cut and fill be used to reduce this effect and create a more uniform grade.

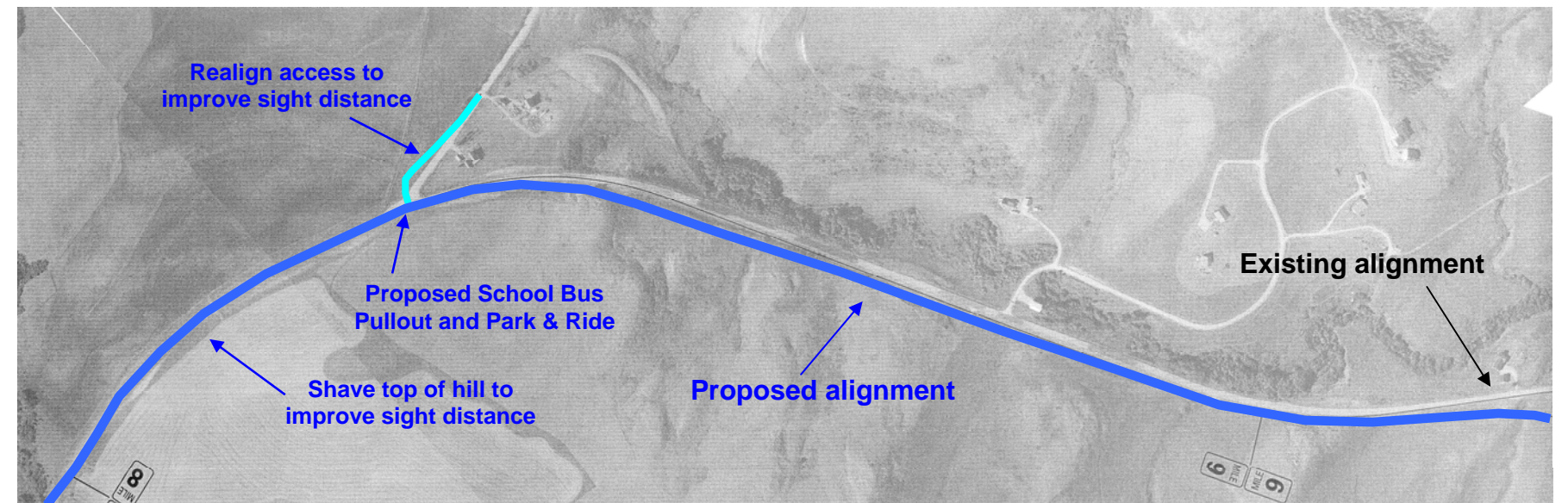




MP 8± to MP 9±

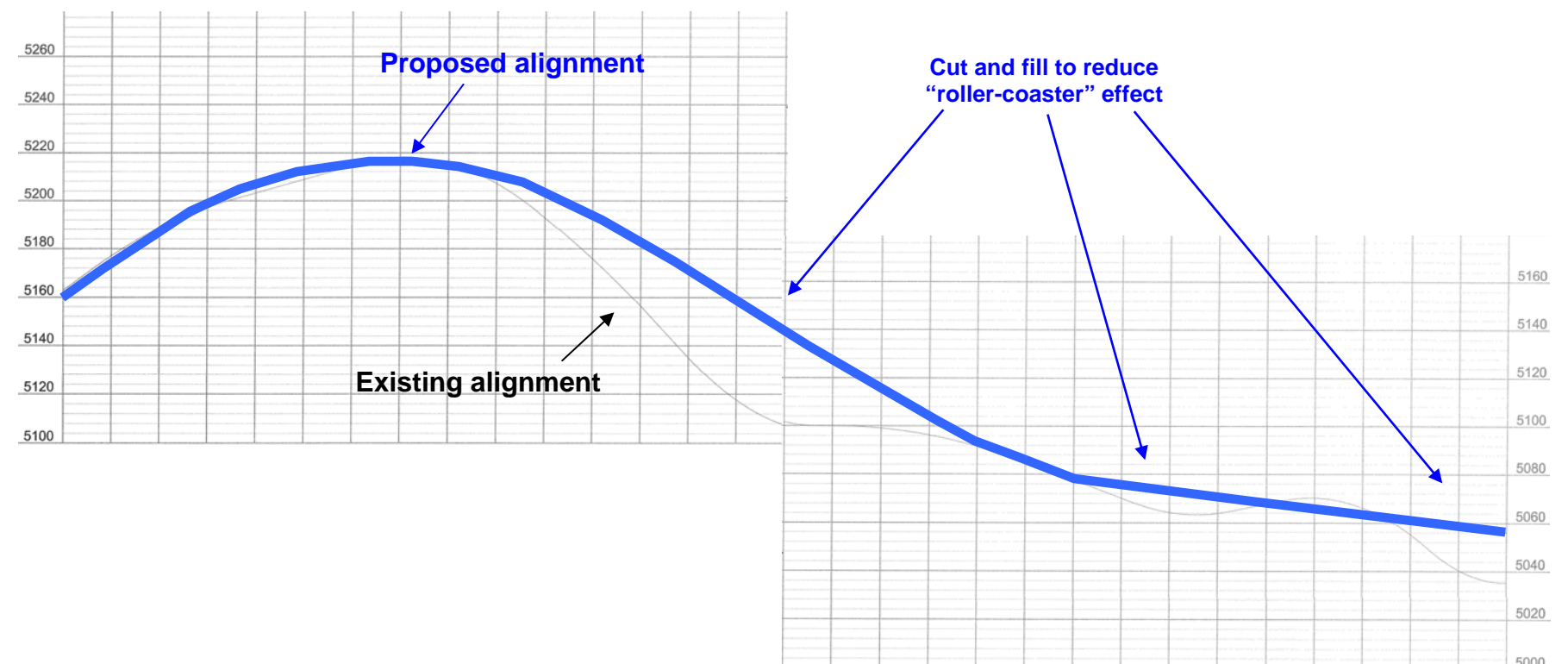
Horizontal

Between MP 8± and MP 9±, it is proposed that the top of the hill be shaved to improve sight distance. At MP 8.2±, it is proposed that Uppeer Luther Road be realigned to improve sight distance. Additionally, a school bus pullout and park & ride facilities are proposed at this location.



Vertical

Between MP 8± and MP 9±, there are several sag and crest curves in the vertical alignment, creating a “roller-coaster” effect. Grades exceeding the maximum recommended grade within this portion of MT 78 range from approximately seven to 11 percent. It is proposed that cut and fill be used to reduce this effect and create a more uniform grade.





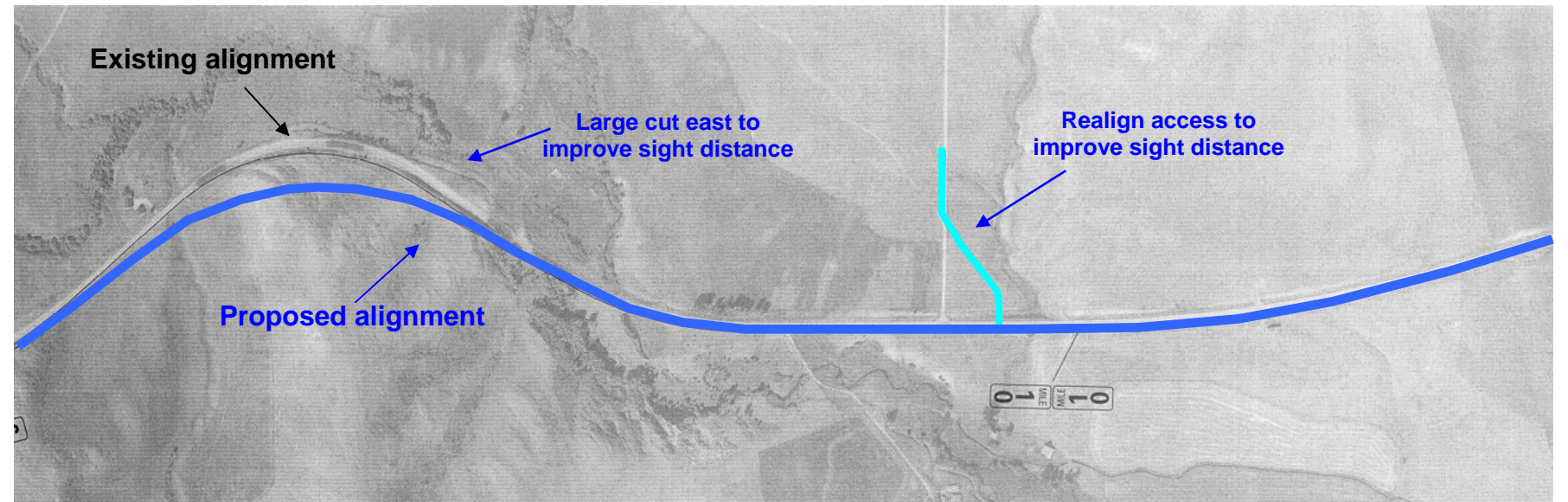
MP 9± to MP 10.5±

Horizontal

At MP 9.4±, there is a sharp horizontal curve. As noted in Figure 4.2, this curve is rated “poor” due to its inadequate curve radius.

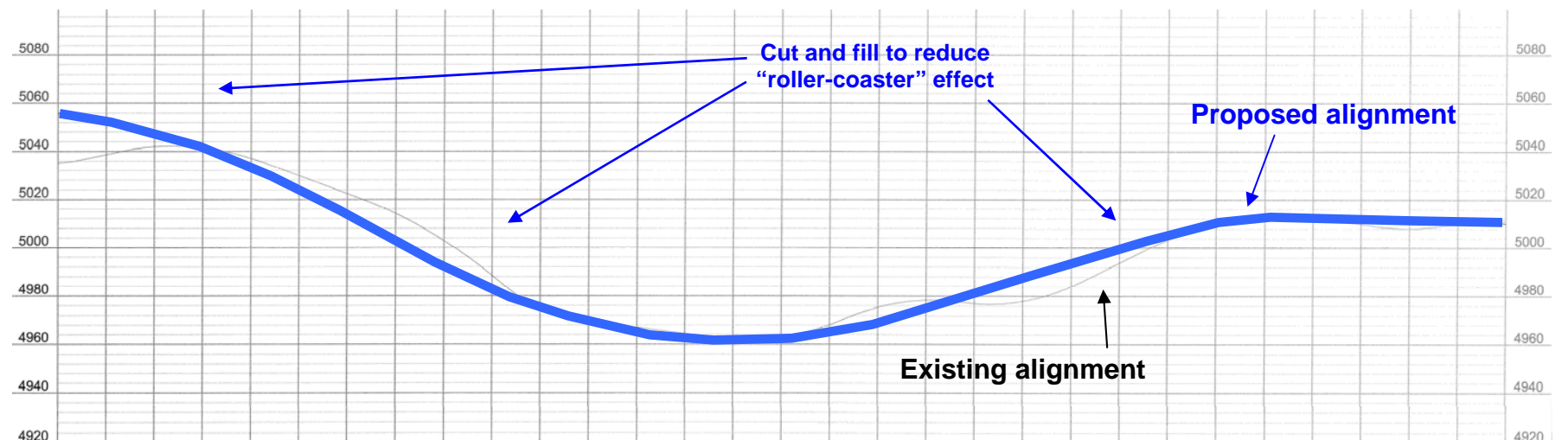
As shown in the aerial to the right, it is proposed that the roadway be shifted to the east in this location to decrease the sharpness of this curve.

It is also proposed that the access point be realigned to improve sight distance.



Vertical

Between MP 9± and MP 10.5±, there are several sag and crest curves in the vertical alignment, creating a “roller-coaster” effect. Grades exceeding the maximum recommended grade within this portion of MT 78 range from approximately eight to nine percent. It is proposed that cut and fill be used to reduce this effect and create a more uniform grade.

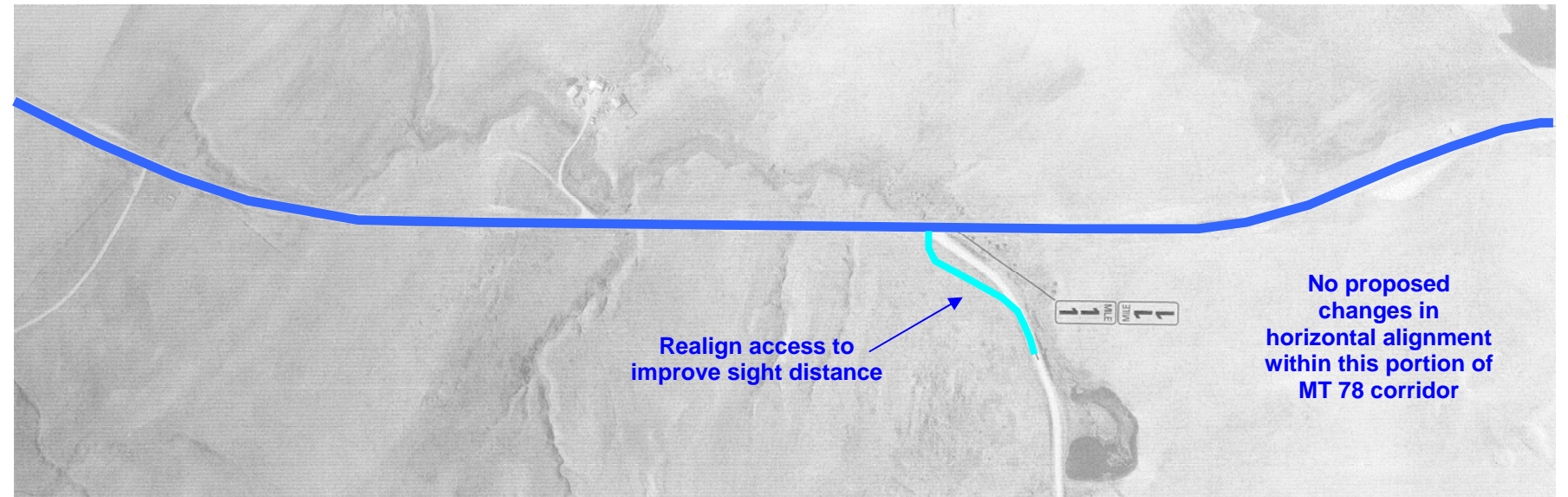




MP 10± to MP 11.5±

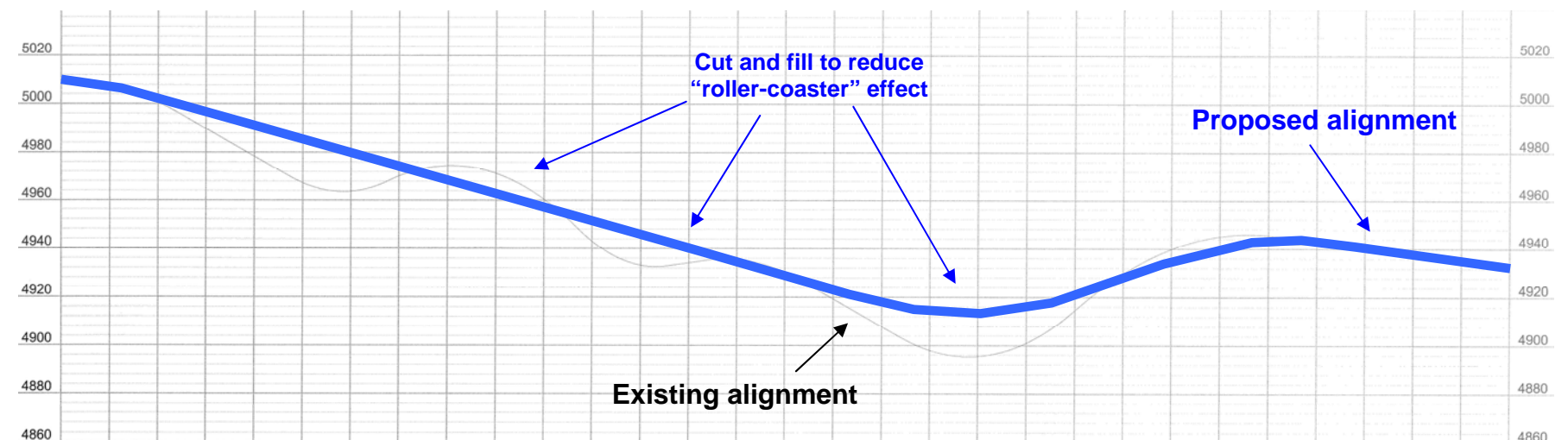
Horizontal

At MP 11±, it is proposed that the access road be realigned to improve sight distance. There are no proposed changes in the horizontal alignment within this portion.



Vertical

Between MP 10± and MP 11.5±, there are several sag and crest curves in the vertical alignment, creating a “roller-coaster” effect. Grades exceeding the maximum recommended grade within this portion of MT 78 range from approximately eight to ten percent. It is proposed that cut and fill be used to reduce this effect and create a more uniform grade.



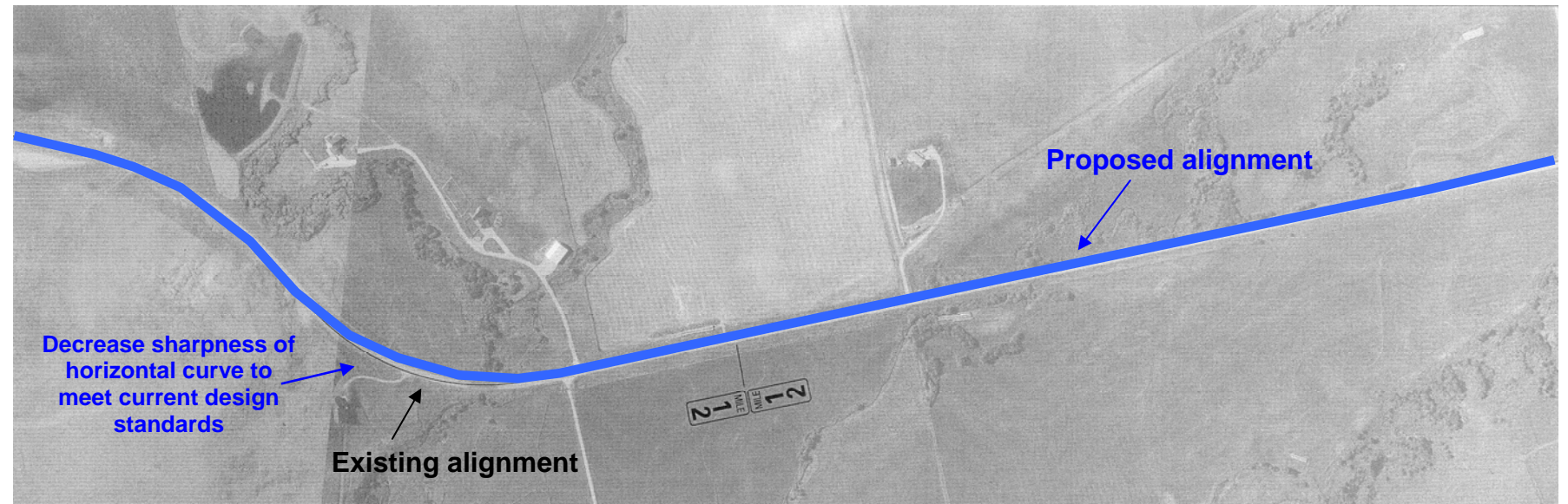


MP 11.5± to MP 12.5±

Horizontal

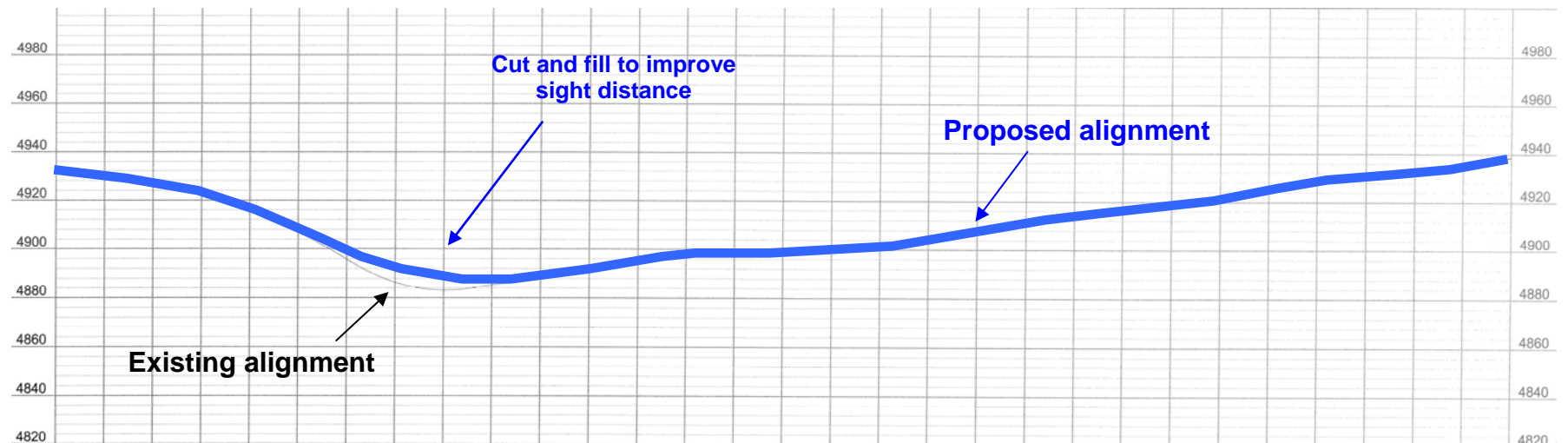
Between MP 11.5± and 12.0±, there is a sharp horizontal curve. As noted in Figure 4.2, this curve is rated “poor” due to its inadequate curve radius.

As shown in Figure 6.1, it is proposed that the roadway be shifted to slightly in this location to decrease the sharpness of this curve. The alignment was shifted only far enough to ensure that the curve meets current design standards.



Vertical

Between MP 11.5± and MP 12.0±, there is a sag curve in the vertical alignment which does not meet current design standards for sight distance. It is proposed that fill be used to improve the sight distance of this curve.

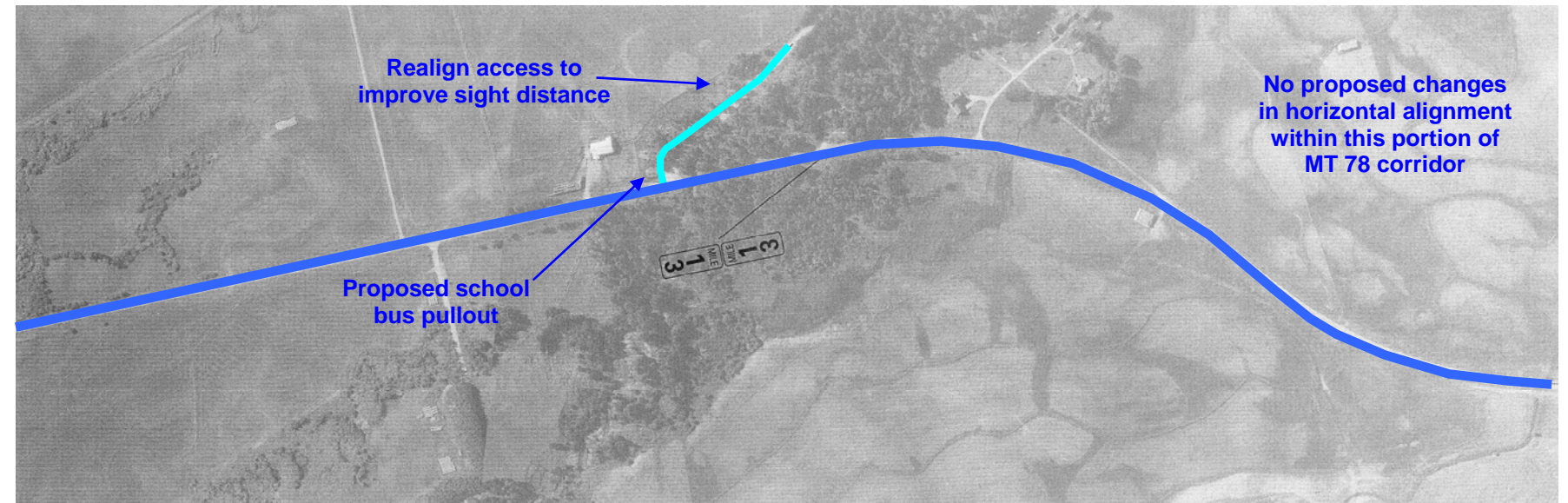




MP 12.5± to MP 13.5±

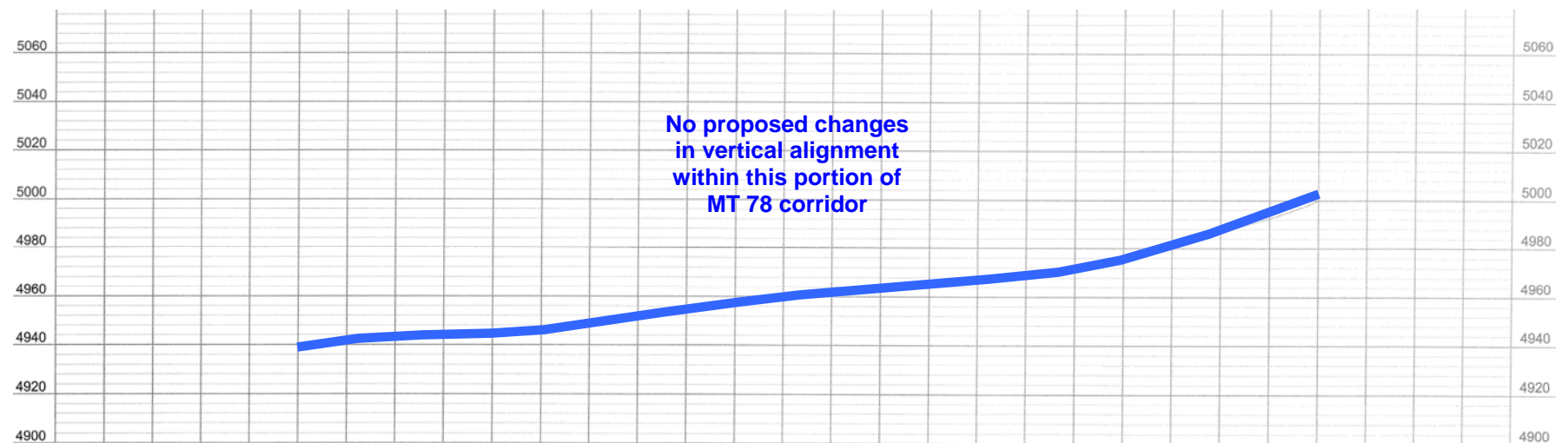
Horizontal

Between MP 12.5± and MP 13.5±, it is proposed that the access point be realigned to improve sight distance. At MP 13.0, a school bus pullout is proposed. There are no proposed changes in the horizontal alignment within this portion.



Vertical

There are no proposed changes in the vertical alignment between MP 12.5± and MP 13.5±.

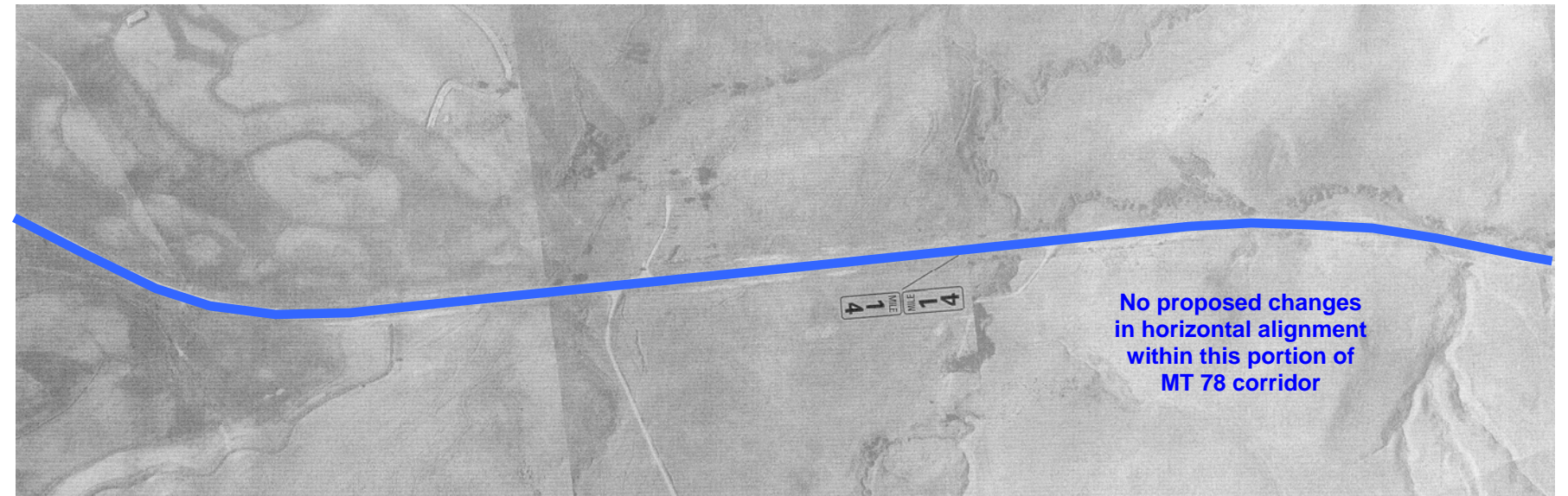




MP 13.5± to MP 14.5±

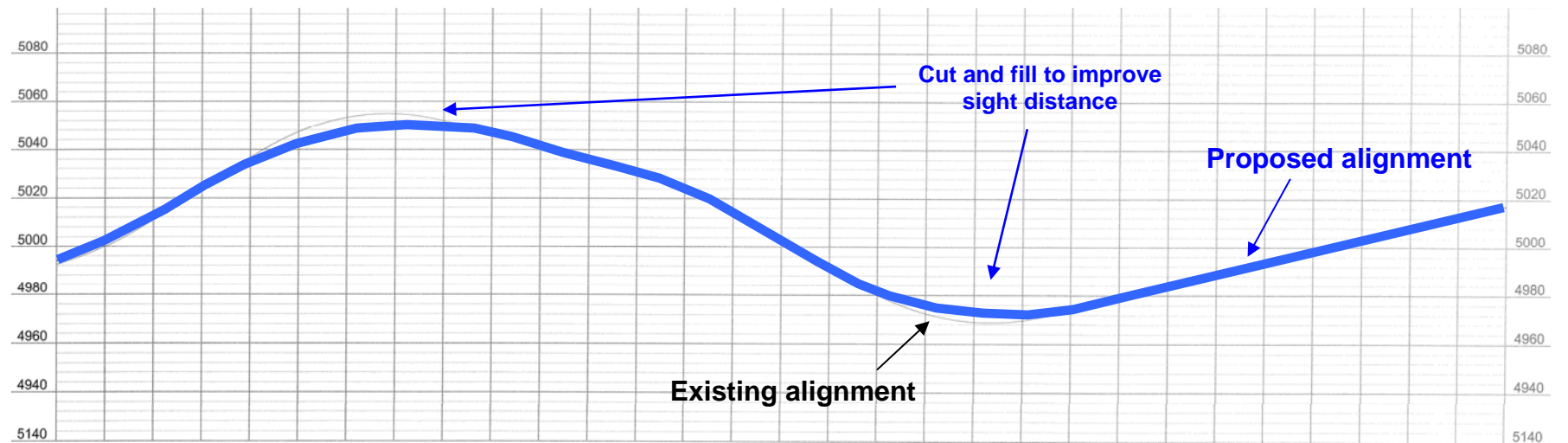
Horizontal

There are no proposed changes in the horizontal alignment between MP 13.5± and MP 14.5±.



Vertical

Between MP 13.5± and MP 14.5±, there is a sag and a crest curve in the vertical alignment, which do not meet current design standards for sight distance. It is proposed that fill be used to improve the sight distance of these curves.

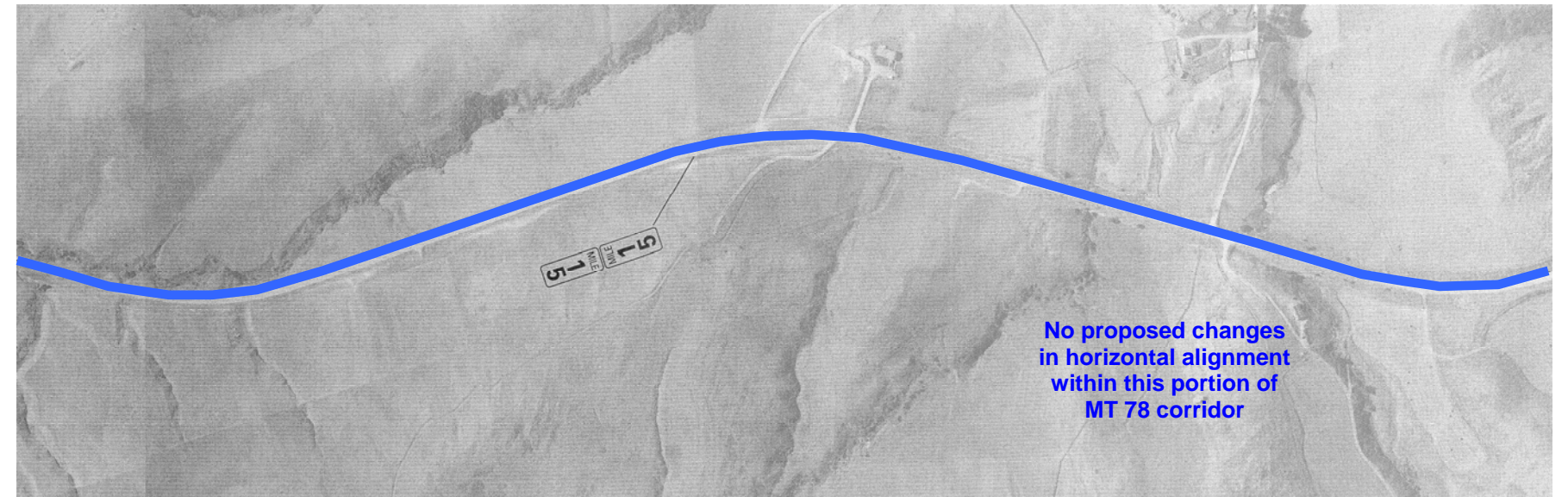




MP 14.5± to MP 15.5±

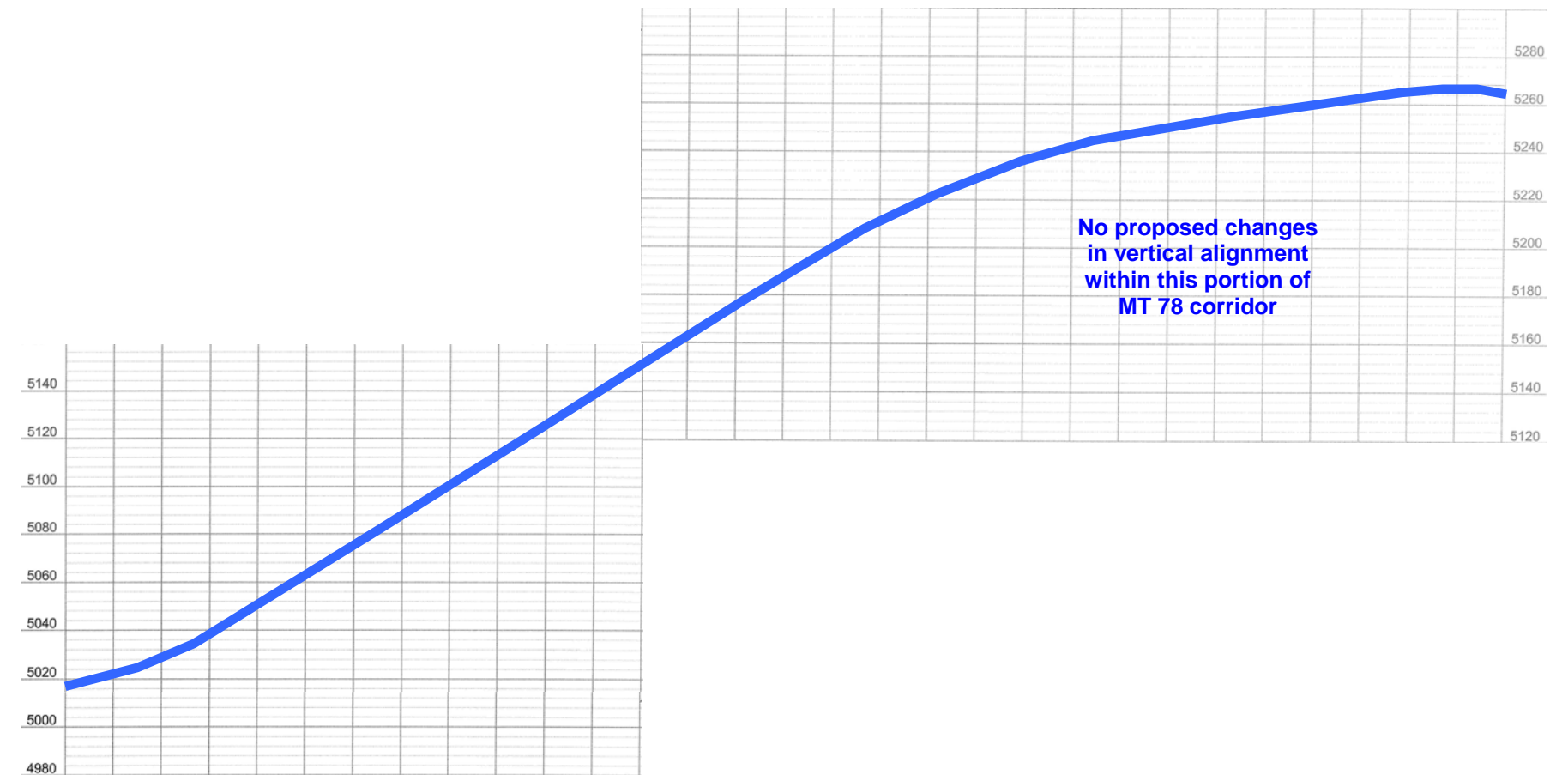
Horizontal

There are no proposed changes in the horizontal alignment between MP 14.5± and MP 15.5±.



Vertical

There are no proposed changes in the vertical alignment between MP 14.5± and MP 15.5±.



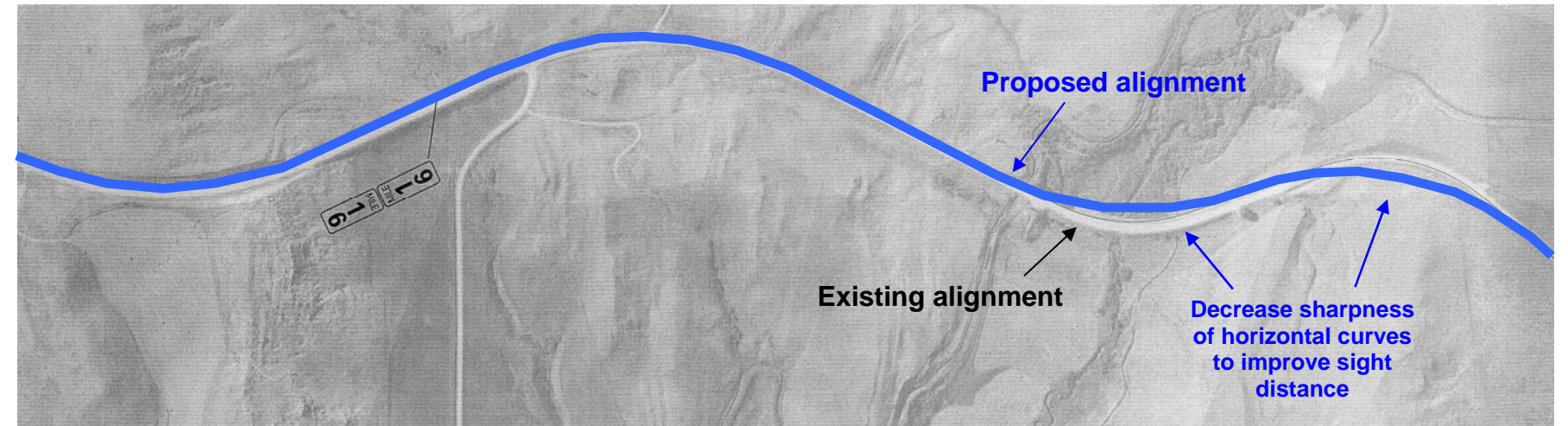


MP 15.5± to MP 16.5±

Horizontal

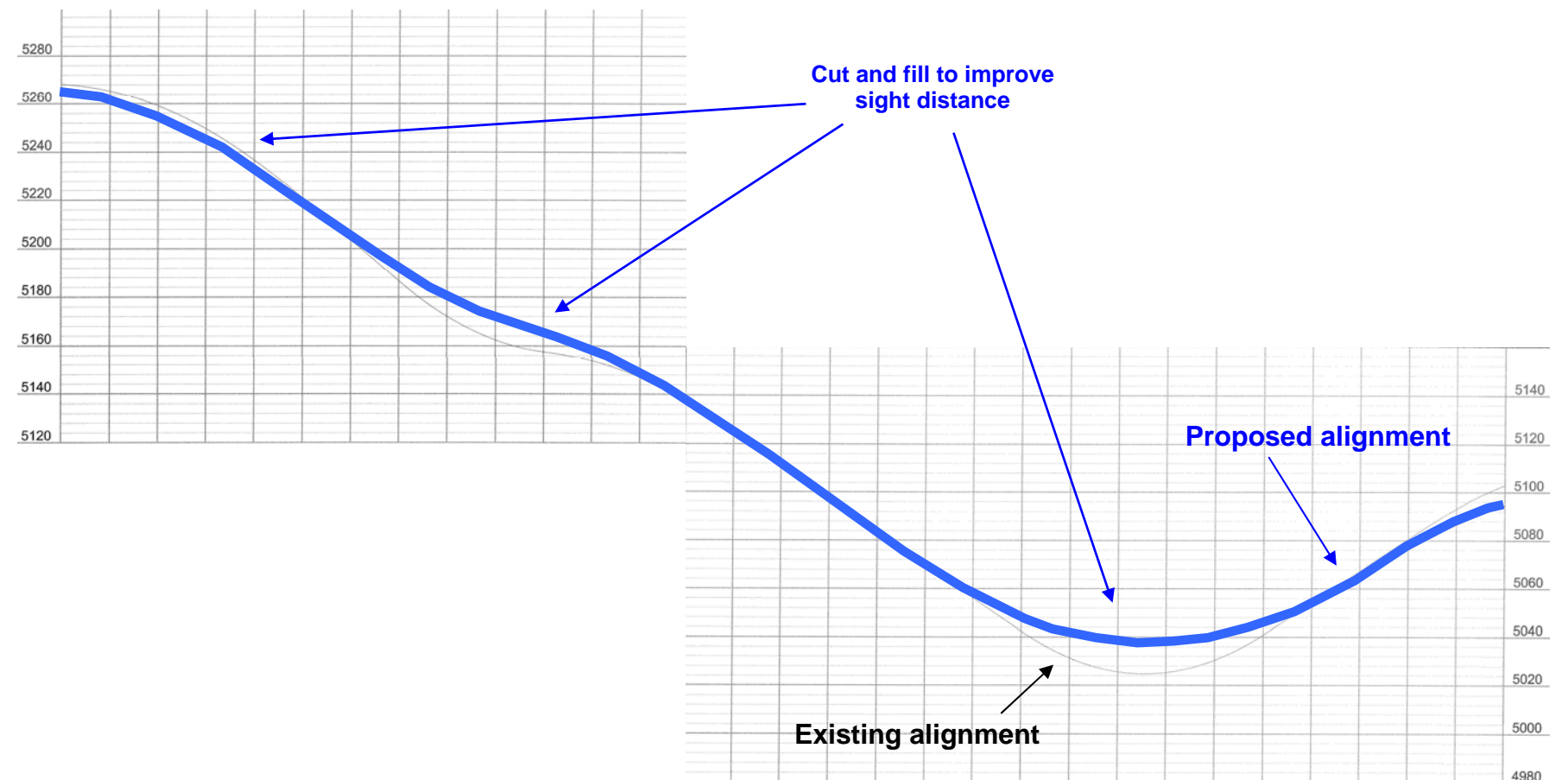
At MP 16.5± and 16.8±, there are two sharp horizontal curves. As noted in Figure 4.2, these curves are rated “poor” due to their inadequate curve radius.

As shown in Figure 6.1, it is proposed that the roadway be shifted to the north and south, respectively, to decrease the sharpness of this curve.



Vertical

Between MP 15.5± and MP 16.5±, there are several sag and crest curves in the vertical alignment, which do not meet current design standards for sight distance. It is proposed that fill be used to improve the sight distance of these curves.



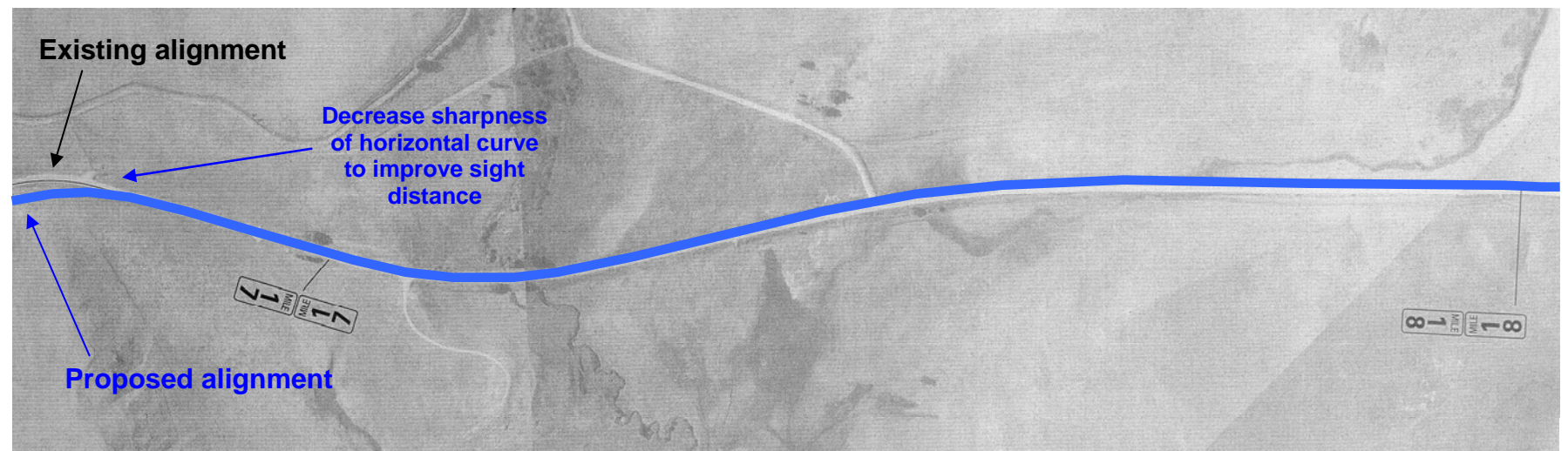


MP 16.5± to MP 18±

Horizontal

Between MP 16.5± and 17.0±, there is a sharp horizontal curve. As noted in Figure 4.2, this curve is rated “poor” due to its inadequate curve radius.

As shown in Figure 6.1, it is recommended that the roadway be shifted to the south to decrease the sharpness of this curve.



Vertical

Between MP 16.5± and MP 18±, there is a crest curve in the vertical alignment, which does not meet current design standards for sight distance. It is proposed that fill be used to improve the sight distance of this curve.





6.2 Roscoe Hill Alignment Options

The Roscoe Hill is the portion of the project between MP 18.0± and the town of Roscoe. The hill's two faces have grades of 7.8 percent and 9.0 percent, respectively. There is poor sight distance at the top of the hill due to the rounded hilltop. There are three options for this portion of the project:

- Option 1: Stay on existing alignment. Shave off hill faces in order to improve sight distance. No alteration of sub-standard grades.
- Option 2: Stay on existing alignment. Bring grades up to standard.
- Option 3: Reconstruct a new alignment at current standards. This alignment would bypass the town of Roscoe and rejoin the existing alignment just past MP 21.

The Roscoe Hill options are discussed below. The options are compared and a recommendation is made in Chapter 7.

Roscoe Hill Alignment Options 1 and 2

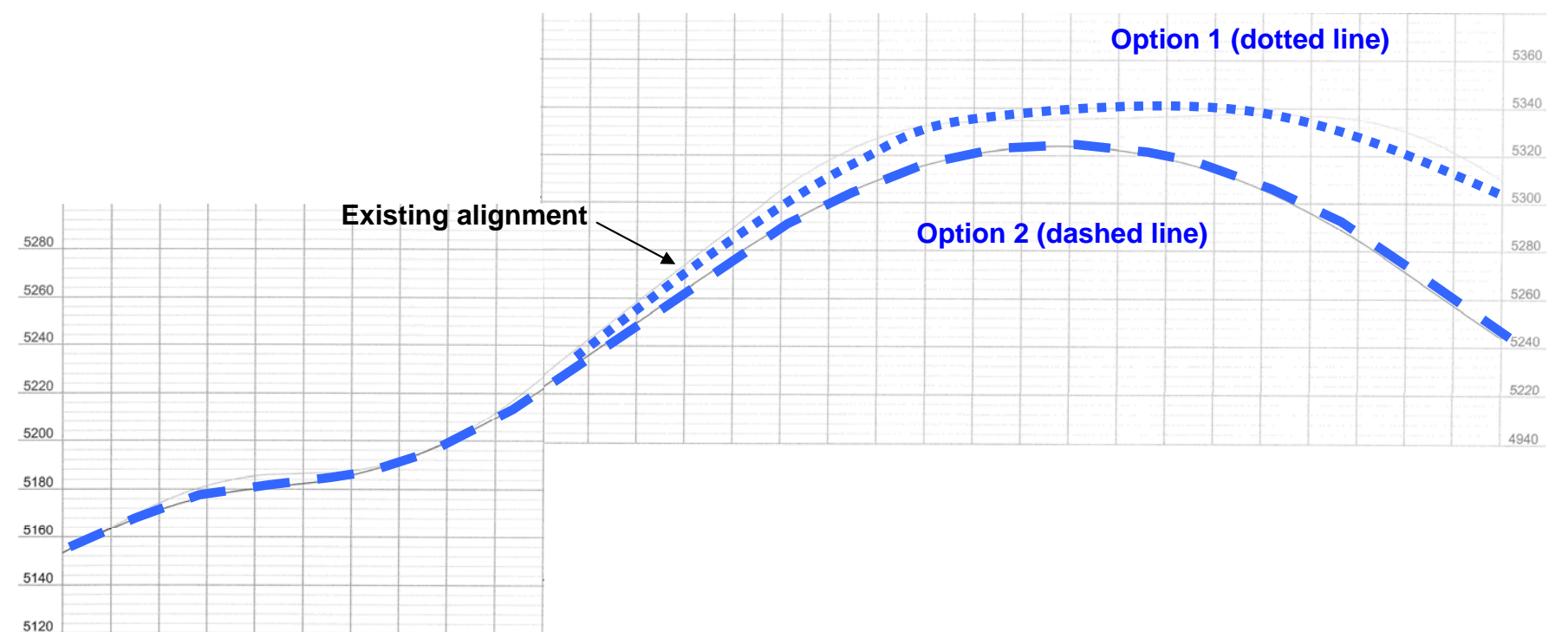
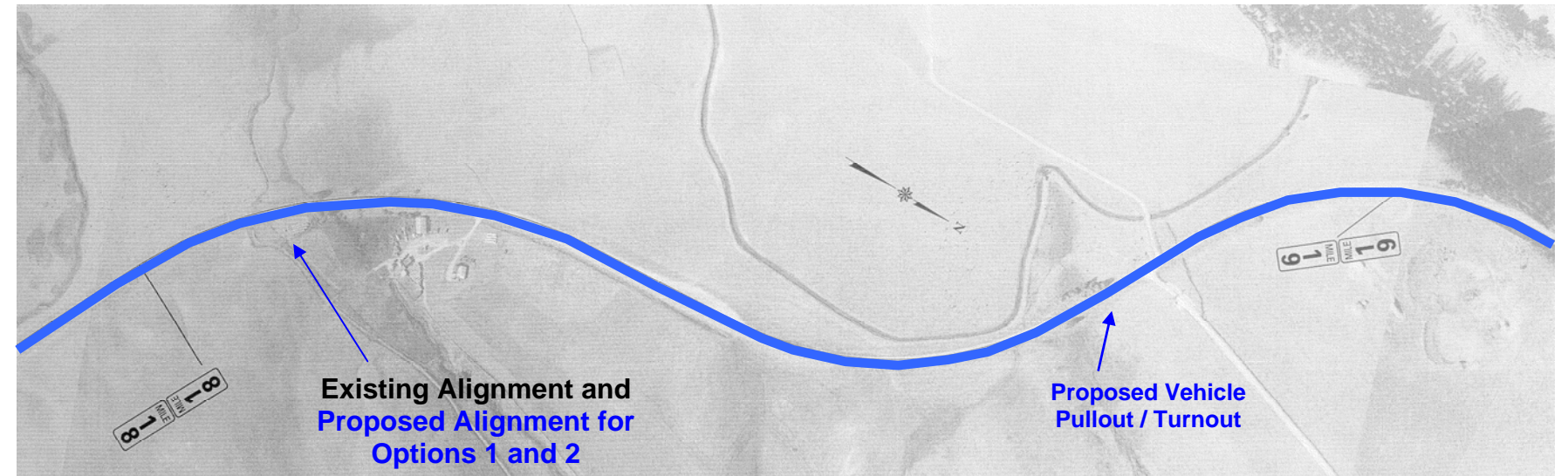
MP 18± to MP 19±

Horizontal

There are no proposed changes in the horizontal alignment between MP 18± and MP 19±.

Vertical

- Option 1: It is proposed that the hill faces at the top of Roscoe Hill be shaved off in order to improve sight distance.
- Option 2: The grade between MP 18± and MP 19± would be substantially reduced from nearly eight percent to just under seven percent to bring the roadway to current MDT design standards. This would require a large amount of earthwork.



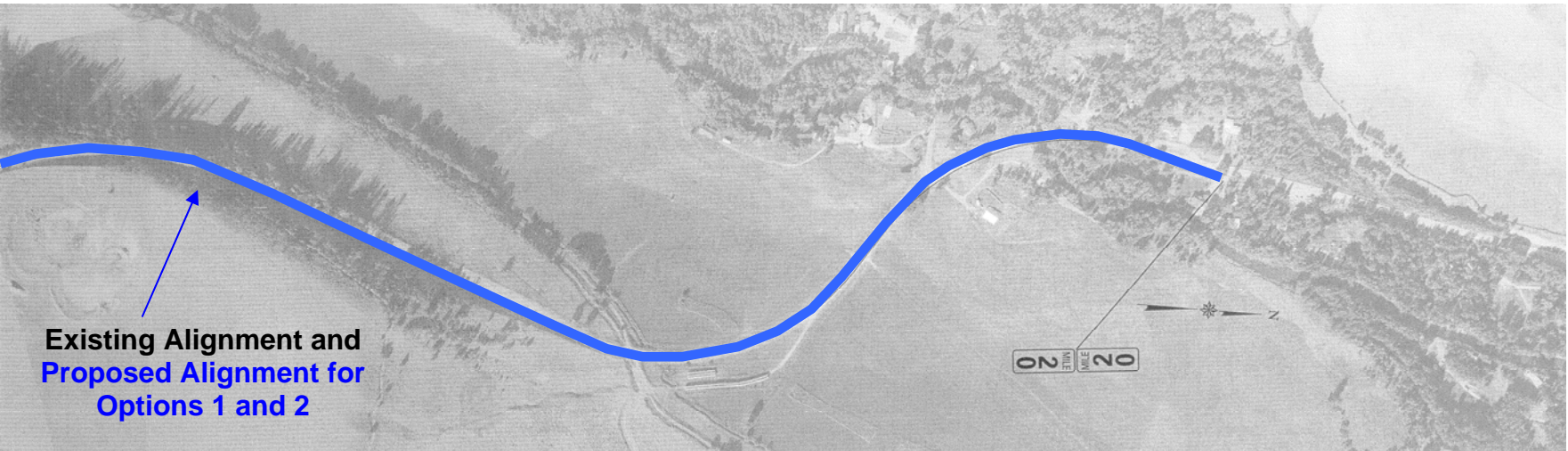


Roscoe Hill Alignment Options 1 and 2

MP 19± to MP 20±

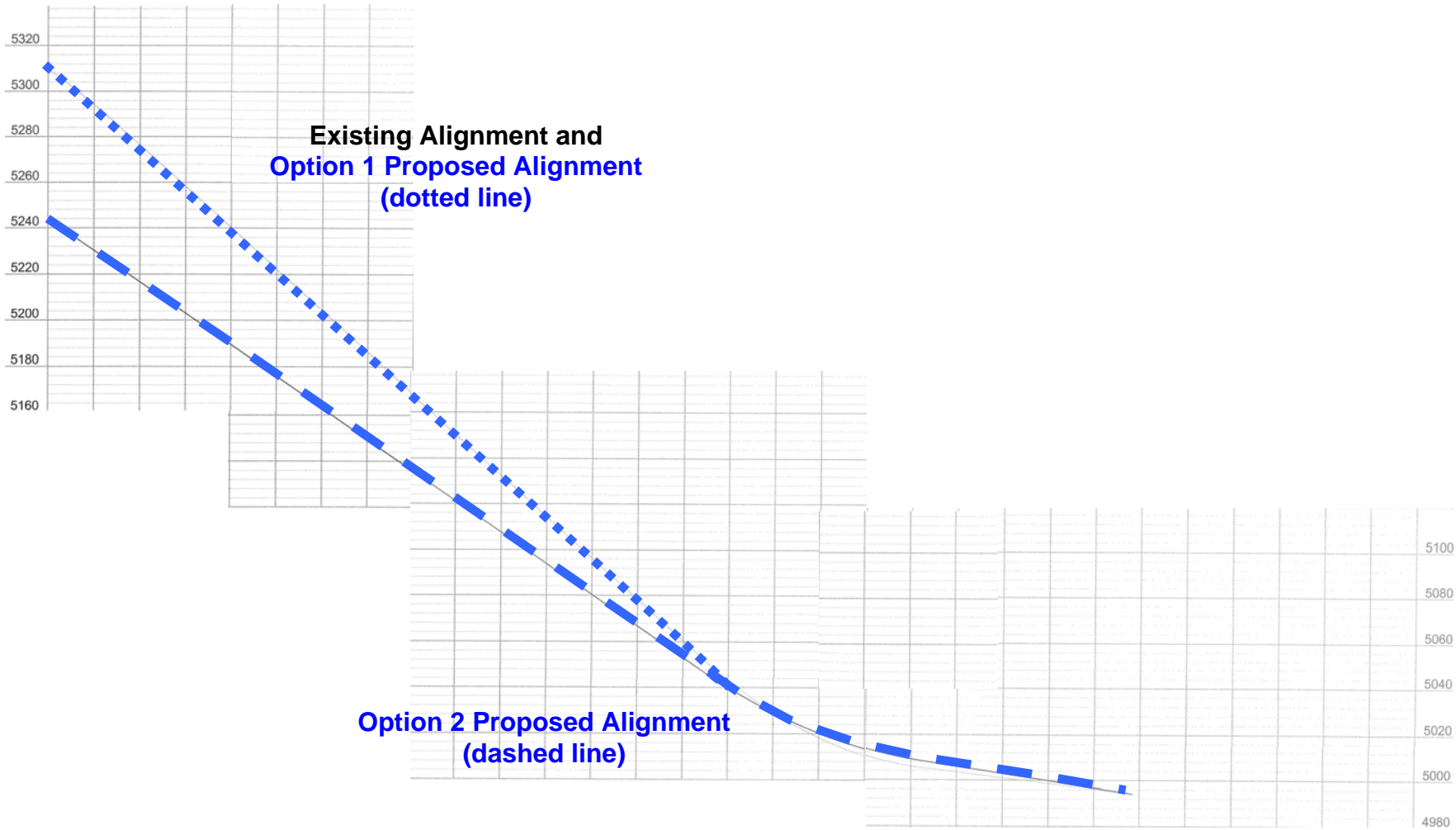
Horizontal

There are no proposed changes in the horizontal alignment between MP 19± and MP 20±.



Vertical

- Option 1: There are no proposed changes to the grade.
- Option 2: The grade between MP 19± and MP 20± would be substantially reduced from approximately nine percent to just under seven percent to bring the roadway to MDT design standards. This would require a large amount of earthwork.



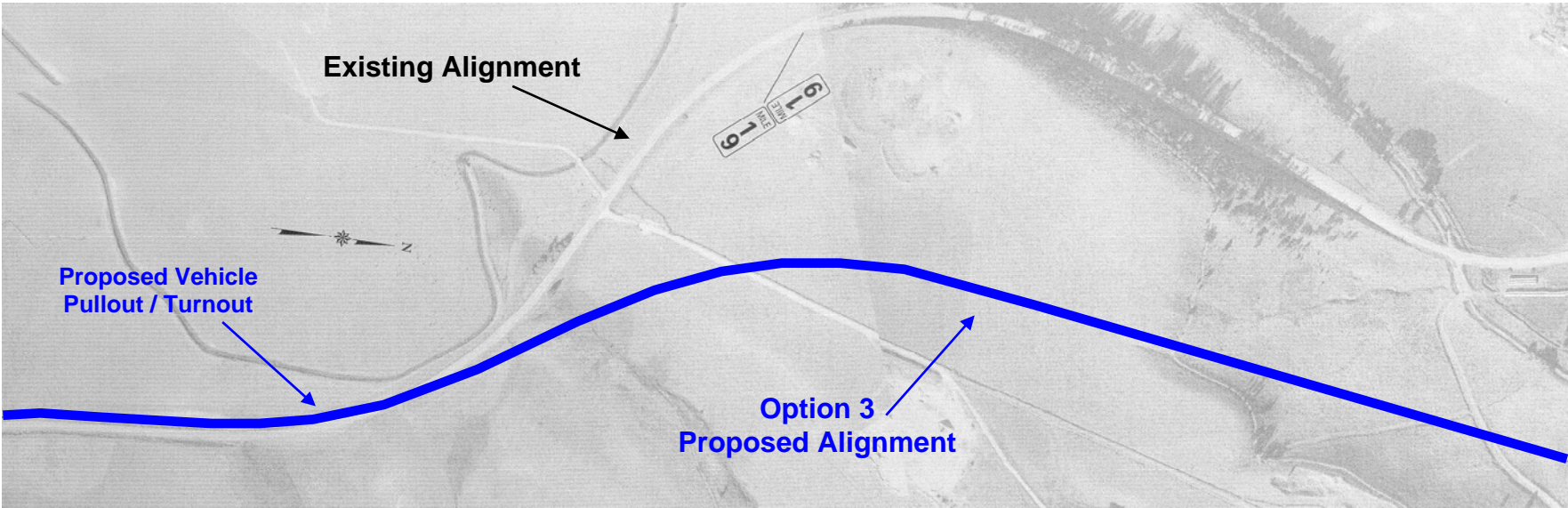


Roscoe Hill Alignment Option 3

MP 18.5± to MP 19.5±

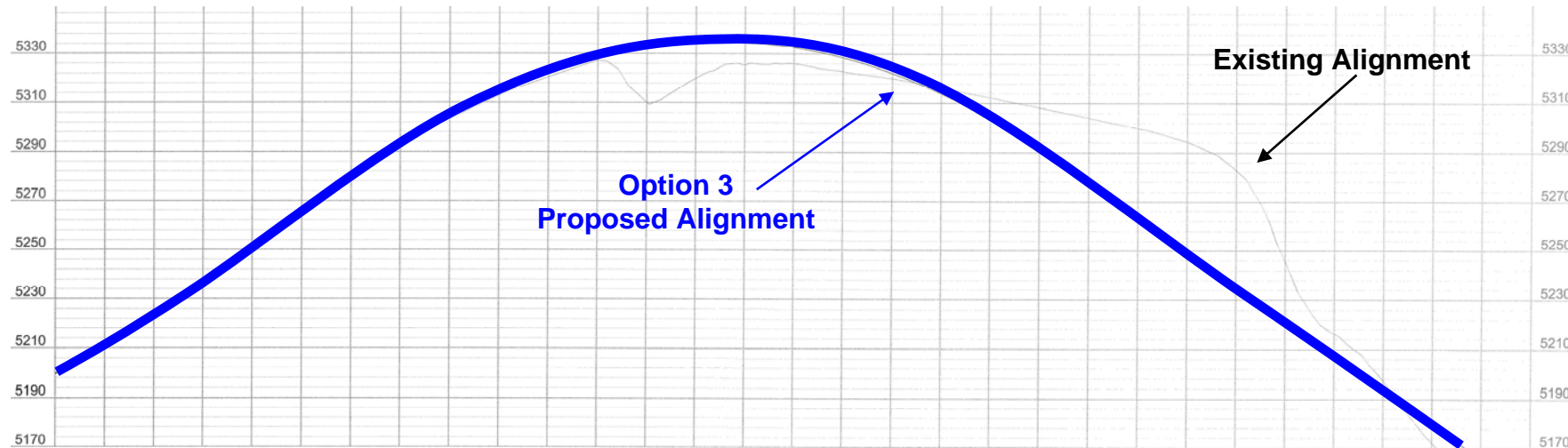
Horizontal

Alignment Option 3 would shift east from the existing alignment starting south of MP 19±. The new alignment would follow the natural curve of the hill to the east of Roscoe and the existing alignment.



Vertical

Alignment Option 3 would result in the construction of a new alignment between MP 18.5± and 19.5± which would meet MDT design standards for vertical grades.



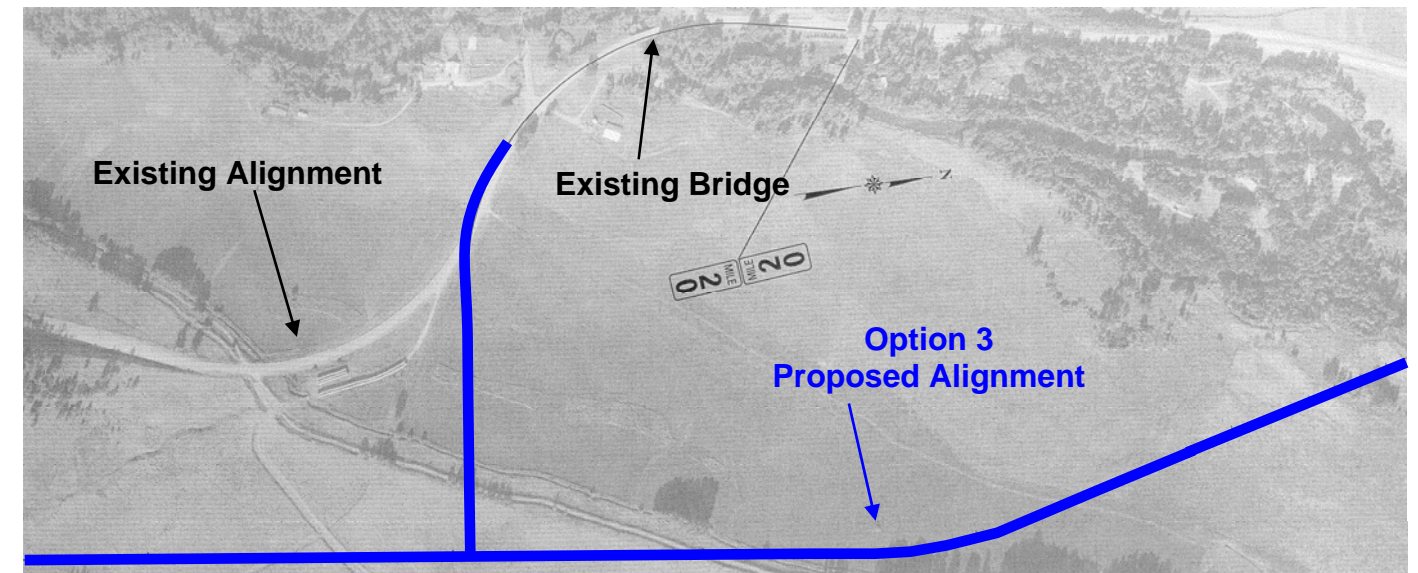


Roscoe Hill Alignment Option 3

MP 19.5± to MP 20.5±

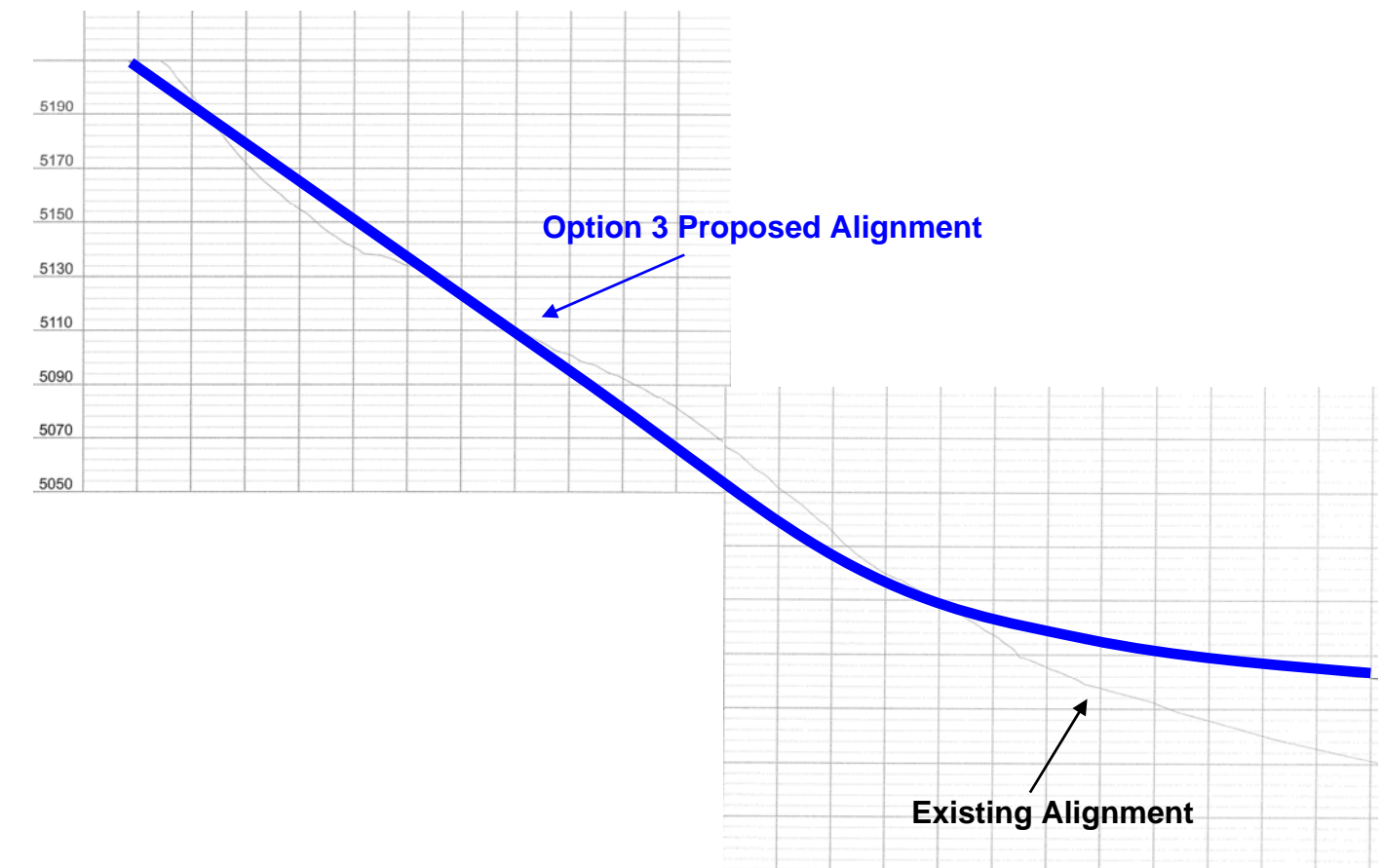
Horizontal

Between MP 19.5± and 20.5±, the new horizontal alignment would continue east of the current alignment and the town of Roscoe. An access to Roscoe would be built at the bottom of Roscoe Hill (MP 20±). The existing bridge on MT 78 would be used for this access road.



Vertical

Alignment Option 3 would result in the construction of a new alignment between MP 19.5± and 20.5± which would meet MDT design standards for vertical grades.



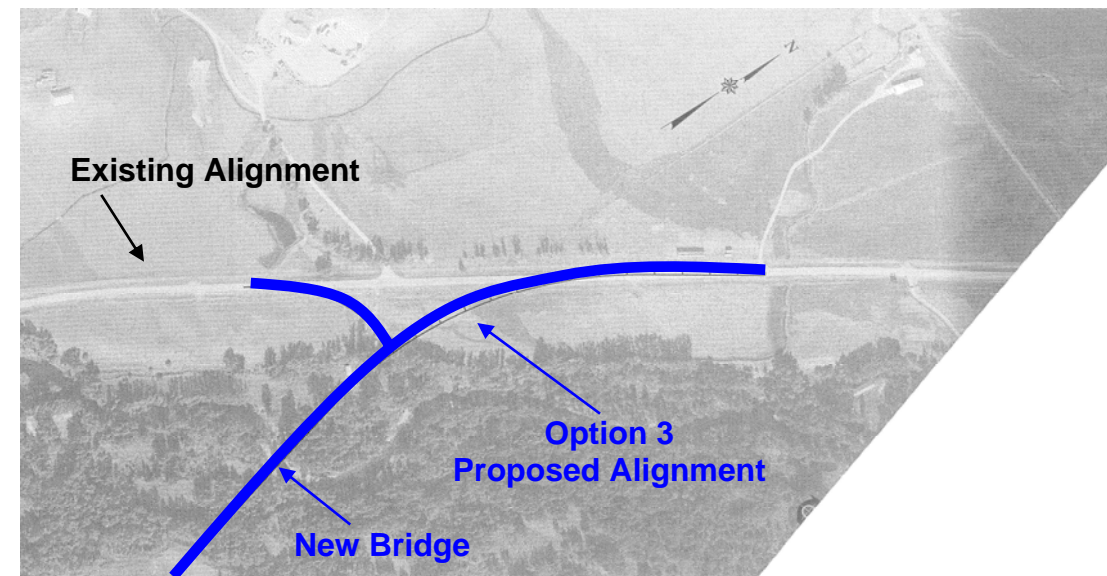


Roscoe Hill Alignment Option 3

MP 20.5± to MP 21.5±

Horizontal

The new alignment for Option 3 would rejoin the existing alignment north of Roscoe. An access to Roscoe would be built north of Roscoe (MP 20.5±). A new bridge would be built over East Rosebud Creek.



Vertical

Alignment Option 3 would result in the construction of a new alignment which would meet MDT design standards for vertical grades.

